

Claims

- [c1] What is claimed is:
- 1.A method for controlling illumination of a backlight of a Liquid Crystal Display (LCD), the method comprising:
- providing a light sensor capable of measuring an ambient light intensity to generate a corresponding measured ambient light intensity value;
- providing a processing circuit for interpreting the measured ambient light intensity value;
- providing a light source that is controllable by the processor;
- providing an LCD device capable of being illuminated by the light source;
- the processing circuit calculating a light source intensity value based on a desired apparent light source brightness value and the measured ambient light intensity value; and
- the processor triggering the light source to emit light at a time-averaged intensity that corresponds to the calculated light source intensity value.
- [c2] 2.The method of claim 1 wherein the light source is a light emitting diode (LED), and the method further comprises:
- the processor providing a driving duty cycle to the LED, the time-averaged intensity of the LED corresponding to the driving duty cycle; and
- the processor adjusting the driving duty cycle according to the calculated light source intensity value.
- [c3] 3.The method of claim 1 wherein the light sensor is a photodiode.
- [c4] 4.The method of claim 3 further comprising providing a current to voltage converter and an analog to digital converter to process signals received from the photodiode to generate the measured ambient light intensity value.
- [c5] 5.The method of claim 4 wherein the LCD device is installed in a mobile phone or a personal digital assistant.
- [c6] 6.The method of claim 1 further comprising providing a user interface to enable a user to select one of a plurality of values for the desired apparent light source brightness value, and to enable a user to modify desired apparent light source

brightness values.

- [c7] 7.The method of claim 6 further comprising providing a memory in which the desired apparent light source brightness value is stored, and the processor fetching the desired apparent light source brightness value from the memory to calculate the calculated light source intensity value.
- [c8] 8.The method of claim 7 further comprising providing a user interface light source controllable by the processor to illuminate the user interface with reference to information stored in the memory.
- [c9] 9.The method of claim 1 wherein the light sensor is a photodiode array, each photodiode sensitive to a unique spectrum of light, and the light source is an LED array, each LED capable of emitting light at a unique spectral frequency, the method further comprising:
the processor providing driving duty cycles to the LED array, the time-averaged intensity of each LED of the LED array corresponding to one of the driving duty cycles; and
the processor adjusting the driving duty cycles according to a plurality of calculated light source intensity values, one of the light source intensity values being used for each LED of the LED array.
- [c10] 10.A device for controlling the illumination of a backlight of a liquid crystal display (LCD), the device comprising:
a light sensor capable of measuring an ambient light intensity to generate a corresponding measured ambient light intensity value;
an LCD;
a light source for illuminating the LCD;
a memory comprising:
a selection program to select a desired apparent light source brightness value stored in a portion of the memory;
a calculation program to generate a light source intensity value based on the ambient light intensity value and the desired apparent light source brightness value; and
a control program to control the light source according to the light source

intensity value; and

a processor for executing the programs of the memory.

- [c11] 11.The device of claim 10 wherein the light source is a light emitting diode (LED).
- [c12] 12.The device of claim 11 wherein the control program calculates a driving duty cycle for the LED, a time-averaged intensity of the LED corresponding to the driving duty cycle calculated by the control program.
- [c13] 13.The device of claim 10 wherein the memory further comprises a plurality of desired apparent light source brightness value relationships stored in a nonvolatile portion of the memory.
- [c14] 14.The device of claim 13 further comprising a user interface that allows a user to select a desired apparent light source brightness value according to the selection program and further to modify desired apparent light source brightness values.
- [c15] 15.The device of claim 10 wherein the light source intensity value is set high when the ambient light intensity value is low and the desired apparent light source brightness value is high, and the light source intensity value is set low when the ambient light intensity value is high and the desired apparent light source brightness value is low.
- [c16] 16.The device of claim 10 wherein the light sensor is a photodiode.
- [c17] 17.The device of claim 16 further comprising a current to voltage converter and an analog to digital converter to process signals received from the photodiode to generate the measured ambient light intensity value.
- [c18] 18.The device of claim 17 wherein the device is installed in a mobile phone or a personal digital assistant.
- [c19] 19. The device of claim 10 further comprising a light source controllable by the processor for illuminating a keypad.